

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)
)
The 4.9 GHz Band Transferred from) WT Docket No. 00-32
Federal Government Use

To: The Commission

COMMENTS OF THE NATIONAL RADIO ASTRONOMY OBSERVATORY

The National Radio Astronomy Observatory (NRAO) hereby submits its Comments with regard to the Commission's Second Report and Order and Further Notice of Proposed Rule Making, FCC 02-47, released February 27, 2002 (2ND R&O/NPRM).

1. The 2ND R&O/NPRM allocated 50 megahertz of spectrum in the 4.9 GHz band for fixed and mobile services used by public safety entities. Although the Commission chose not to permit aeronautical mobile service use of this band in order to protect radio astronomy observations in this band, it also refused to exclude other mobile operations from this band or to impose frequency coordination requirements on public safety users in areas near radio astronomy zones. The Commission was swayed by the belief that "given the small number and remote locations of radio astronomy observatories, public safety deployment in the 4.9 GHz band in their vicinity would be unlikely and any public safety operations that may occur would likely be short-term." 2ND R&O/NPRM at ¶17. The Commission chose to rely instead on the existing requirement in footnote US311 of the Table of Frequency allocations that parties "make every practicable effort to protect radio astronomy facilities that operate on an unprotected basis in the band." Id.

2. Having determined that public safety use of the 4.9 GHz band was appropriate, the 2ND R&O/NPRM then sought public input on a number of technical matters relating to implementation such as eligibility, fixed and mobile uses, channel plans, licensing, interference determinations and technical standards for equipment and technical rules. The observations made with many of the NRAO's telescopes will likely be significantly degraded if the Commission indiscriminately opens the doors to unfettered public safety users without some measures of control to reduce the chances of interference.

3. The NRAO was established in 1957 to provide sophisticated telescopes and related facilities to radio astronomers affiliated with universities, other observatories, government laboratories and private industry who might otherwise not have these resources available to them. Under the terms of a cooperative agreement with the National Science Foundation, the NRAO facilities are operated by a nonprofit corporation, Associated Universities, Inc., which was founded by nine universities: Columbia, Cornell, Harvard, Johns Hopkins, Massachusetts Institute of Technology, Pennsylvania, Princeton, Rochester and Yale. The NRAO currently oversees operations of radio astronomy observatories from Green Bank, West Virginia and Socorro, New Mexico.

4. The major telescope system operated at Green Bank is the new \$75 million Green Bank Telescope funded by Congress to replace one which collapsed. Green Bank is located within the National Radio Quiet Zone, a 13,000 square mile, rectangular area which was designed to minimize interference to radio astronomy research conducted there. At Socorro, NRAO operates the Very Long Baseline Array (VLBA) consisting of ten automated 25-meter radio telescope

antennas at ten sites across the United States and its territories, from Mauna Kea, Hawaii to St. Croix, Virgin Islands. Data from each receiver are combined in a specially designed digital computer system allowing the synthesis of a single radio telescope 8000 kilometers (5000 miles) in diameter, the largest dedicated telescope in the world. An additional facility at west central New Mexico, the Very Large Array (VLA), consists of twenty-seven automated 25-meter radio telescope antennas. Like the VLBA, data are combined to allow synthesis of a single radio telescope. The VLA is the most scientifically productive, ground-based telescope in the history of mankind. NRAO is also designing the Atacama Large Millimeter Array (ALMA), a major millimeter wavelength interferometric observatory.

5. The NRAO is highly supportive of efforts by the Commission to find a "home" for public safety entities with increasingly sophisticated communications needs, particularly as demonstrated by the September 11 national tragedies. However, the NRAO is potentially adversely impacted by the allocation of the 4.9 GHz band for public safety use. While NRAO's use of this band is passive and secondary, the 4990 - 5000 MHz frequency band provides the NRAO with a unique tool to determine radio source spectra. Most radio sources emit continuum radiation which is emission that extends relatively smoothly over the radio spectrum. To establish the frequency dependence of the radio waves emitted by these objects, measurements are required at a number of frequencies. Because the spectrum of continuum is usually smooth, observations are not required at closely spaced frequencies, but rather observations at the octave intervals afforded by current frequency allocations (e.g., 2690-2700 MHz, 4990-5000 MHz and 10680-10700 MHz) are usually adequate. The radio astronomy bands near 4.9 GHz are special radio "windows" that allow the unique determination of the radio source spectrum. Contamination of the 4.9 GHz band by fixed and mobile service operations would be a serious loss to the octave interval data.

6. This being the case, then an expansive description of eligible users of public safety radio services can only increase the likelihood of the interference which the Commission, in its 2ND R&O/NPRM, originally characterized as "unlikely." Expanding the universe of users can only cause more potentially harmful interference, not less. This is especially true since the Commission has signaled its willingness to permit usage of the band to fixed as well as mobile operations in order to avoid inefficient use of the spectrum. 2ND R&O/NPRM at ¶40.

7. The licensing scheme is an area of great concern to NRAO. The ability of the NRAO to identify the source of harmful interference is a difficult one, at best. However, the trend toward geographic and blanket licensing and heavy, almost exclusive reliance on frequency coordinators has hampered NRAO's efforts to identify, locate and contact the source for purposes of coordination and elimination of interference. It is one thing to encourage radio spectrum users "to make every practicable effort to protect radio astronomy facilities" but it is quite another when such effort fails, either through inadvertence, ignorance or, though rarely, by design. The NRAO urges the Commission to adopt a licensing methodology that will permit rapid identification of the spectrum user in the event that harmful interference is received at a radio astronomy facility. As the Commission itself notes, the absence of mobile licenses may make frequency coordination between fixed and mobile operators difficult. 2ND R&O/NPRM at ¶51. The NRAO's ability to prevent the contamination of its research will be similarly thwarted.

Respectfully submitted,

NATIONAL RADIO ASTRONOMY OBSERVATORY

By: Christopher J. Reynolds

Reynolds and Manning P.A.
Post Office Box 2809
Prince Frederick, MD 20678
(410) 535-9220

By: Mark McKinnon

Deputy Assistant Director
Socorro Operations
National Radio Astronomy Observatory
Post Office Box 0
Socorro, NM 87801

July 8, 2002